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ABSTRACT

Thirty mothers of first-grade Papago Indian children were trained by selected Papago paraprofessionals to teach their children to ask causal questions. The procedures used by the mother in the home environment included role playing, modeling and giving the child verbal praise. Between formal training sessions with the paraprofessionals, the mothers practiced a previously learned skill with their children. Study findings of the children's question-asking response data indicate that the mothers, after having training in socialization skills, significantly increased their children's performance on the question-asking tasks over performance attributable to direct modeling instruction by the experimenter. A later factor analysis suggests that well planned instruction, targeted on specific skills, may be effective regardless of a child's general level of past achievement in academic subjects. A list of the paraprofessional training objectives, a table of parent training lessons and goals, achievement test data, and factor questionnaires are also included. (ST)

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# THE SOCIALIZATION OF INTELLECTUAL SKILLS IN PAPAGO CHILDREN: THE EFFECTS OF A PARENT TRAINING PROGRAM.

By: Ronald W. Henderson
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The work reported herein was conducted under subcontract to Indian Oasis School District, Arizona. The project was supported by the Arizona State Department of Education as a "A Program to Develop Question-Asking Skills in First Graders," Project No. 73-2007 CO, under the authority of P.L. 89-10, Title I. The opinions expressed in this report do not necessarily reflect the position or policy of the Indian Oasis School District, or the Arizona State Department of Education, and no official endorsement by these agencies should be inferred.

# PREFACE

The investigation reported in this document was conducted by the Office of Child Research of the Arizona Center for Educational Research and Development under a sub-contract from Indian Oasis School District No. 40, Sells, Arizona. The work represented in this report is an example of one aspect of the mission of the Office of Child Research. That mission is to conduct basic and applied research on the learning and development of children and youth, and to translate results of this research into principles and procedures which can be used to enhance learning. These activities are carried out independently, as part of the regular assignment of staff members of the Office, under grants and contracts from governmental agencies and private foundations, and, as in the case of this project, as a direct service to school districts.

The study was initiated in response to an inquiry from Mr. Don Peterson, Superintendent of Schools of Indian Oasis School District. Indian Oasis is a public school district on the Papago Indian Reservation in Southern Arizona. Mr. Peterson's inquiry was prompted by a report of a project in which we had successfully trained Mexican-American mothers to use socialization practices which effectively facilitated the development of question-asking skills in their young children. Mr. Peterson reported the observation that, for many Papago children, question-asking is not a well developed skill, and he was therefore interested in conducting a similar project in his school district.

A study of this kind could be important in several respects. It yields information on the effectiveness of a set of procedures for teaching an important intellectual skill to children, and on the results of a training program for parents. The project provides insights concerning the feasibility of training Indian paraprofessionals to train parents in relatively isolated locations. The data also give some insights and raise additional questions concerning cultural and individual factors which influence responsiveness to the kinds of instructional procedures which were devised for this study. Moreover, the study touches upon some sensitive issues relating to the ethics of intervention with culturally different groups.

This study would not have been possible without the cooperation and active support of numerous individuals. Our first and greatest debt is to the Papago parents and children who participated in the research. Special acknowledgement is also given to Mrs. Audrey Peterson, who served with skill, sensitivity, and sound judgement, as trainer for the paraprofessionals who worked as parent trainers. Madeline Toro and Mae Galvez demonstrated that they could master, and then convey to parents, the rather technical teaching skills to be used with children who participated in the study. The effects of their efforts are convincingly demonstrated by the data on children's question-asking.

Our debt of gratitutde is also expressed to the professional educators whose cooperation made the study possible. Mr. Don Peterson's role in initiating the study has already been mentioned. Mrs. Bea Bates of the Title I Division of the Arizona Department of Education gave us continuing support and encouragement. Her interest was communicated directly to participating mothers who, as a result of Mrs. Bates' contageous enthusiasm, saw more

clearly the significance of their role as the first and most important teacher of their children. Thanks are due also to Sister Alice Marie, reading specialist for the school district, Sister Marie Bernadette, principal at Topawa, Mr. Danskill, principal at Sells, and to the first grade teachers in these two communities.

We are also deeply endebted to Mrs. Lubbers, Business Manager for the Indian Oasis School District, for attending to the operational details which made the project run. Gratitude is expressed also to Mr. Keith Meredith who supervised computer operations and consulted on the analysis of the data.

To all of the other important but unnamed friends and colleagues who gave their time, their ideas and encouragement, we also give thanks.

# THE SOCIALIZATION OF INTELLECTUAL SKILLS IN PAPAGO CHILDREN: EFFECTS OF A PARENT TRAINING PROGRAM

## Introduction

This study deals with three sets of interrelated goals. The first set includes those objectives which we set out to achieve when the study was initiated. This goal was to develop causal question-asking skills in Papago first-grade children. We hoped to accomplish this goal by teaching parents to use instructional procedures designed to increase question-asking skills of their own children. The second set of goals, therefore, relates to the training of paraprofessionals who in turn trained parents to exercise these learning-theory-based procedures. These goals were instrumental to the accomplishment of the main purpose of the study, since parents had to learn specific skills before they could employ procedures to enhance the question-asking skills of their children.

The third set of goals was not specified at the time the project was proposed. Rather, these goals relate to questions which we stumbled across and recognized as important as the study progressed. We discovered, for example that some children responded rapidly to instructional modeling, and other children did not. We wondered whether such ready responsiveness to modeling procedures is predictive of later performance, after intervention by a parent. We also became interested in cultural and individual differences which might influence children's amenability to modeling influences, and we collected data which we hoped might cast some light on this question. Another issue of interest was whether or not there is a relationship between

school achievement, as reflected by scores on a standardized test, and responsiveness to modeling instruction and to parental intervention targeted on a specific intellectual skill.

Rationale for the Intervention

This project may be regarded as an intervention effort aimed at teaching a particular intellectual skill to Papago first grade children, and as a test of an intervention strategy. While schooling itself may be considered as a kind of intervention when applied to a group whose traditional culture has not included such formal provisions for education, intervention is used here to refer to a more limited attempt to bring about a specified behavioral change by instituting a new set of procedures.

While teaching children to ask good questions is a worthy aim on its own merits, in this study change in children's question-asking skills was secondary in importance to another consideration. Data on the growth of question-asking skill may provide an index of the feasibility of training Papago mothers in the use of principles which could be applied to a vast range of other desired behaviors in their children. The most naive environmentalist would not expect the results of a single intervention to make a significant practical difference in a child's long range intellectual development. Nor would we expect question-asking skills taught in this study to automatically generalize to conditions and settings much different from those that were used in the experiment. But if it is found that mothers in the reservation setting can learn to apply socialization practices based on learning theory, and if their efforts are effective, then we would be encouraged to develop means of helping the parents to generalize these skills to facilitate other aspects of the child's development. Then one might hope

PS 00620

to develop programs capable of producing effects of real practical significance for the intellectual growth of children.

The intervention used in this study might be characterized as an applied experiment. As such it differs in a number of ways from the interventions which are most common in compensatory education programs. Characteristically, educational intervention projects have been targeted on a broad range of objectives. The focus of this project on a very circumscribed range of objectives may appear to be a very simple undertaking to readers who are familiar with manifold intervention efforts. The restricted nature of the objectives, in terms of child behavior, belies the complexity of the operational realities of a project such as this, and certainly does not do justice to the complex practical, theoretical, and ethical issues dealt with in this research.

Three basic considerations comprise the rationale. The first involves psychological points of view on the contributions of the home environment to intellectual development. The second consideration is the point of view that social learning principles provide a means by which trained parents can deliberately facilitate the development of important intellectual skills in their children, and that question-asking is one important intellectual skill. The third issue to be considered is an appraisal of ethical and cultural aspects of an intervention project such as this one.

Contributions of the Home Environment: The past decade has witnessed a dramatic increase in interest in early childhood education in this country. In large measure, this interest has been stimulated by evidence that the child's early experience may markedly influence the development of his intellectual competence. Preschool programs and new instructional approaches for the early years of school have been justified by evidence that intellectual

performance is a malleable characteristic, subject to the influence of experience (Hunt, 1961), and by Bloom's (1964) analysis of factors influencing stability and change in human intellectual performance. Bloom concluded that 80 per cent of mature intelligence is achieved by age eight. Since minority groups and poor children characteristically perform less well than middle class children on ability and achievement measures, and since early experience is now thought to play a major role in intellectual development, many educators have concluded that the difficulties which culturally different children have with school learning must be due to deficiencies in their home backgrounds.

This point of view has led to all kinds of compensatory programs based on the assumption that poor children or children from ethnic minorities are "disadvantaged" because of deficiencies in their home environments. Not only is this point of view ethnocentric, but it seems also to omit from consideration other psychological viewpoints on the development of intellectual skill which would suggest a different interpretation of the literature on the contributions of early experience to intellectual development. For example, many psychologists would agree with Bruner's (1964) proposition that intellectual development is dependent upon the problem solving strategies which the individual learns through contact with his culture. The kind of intellectual skill developed by individuals is likely to be influenced not only by the problems which the individual confronts as he interacts with his environment, but he will also learn those intellectual skills that are valued and emphasized by the significant others around him. This view is widely held by anthropologists (vide Voget, 1970), and psychologists such as Vernon (1965) have suggested that other cultures may have evolved intelligences that are especially well adapted and better fitted than our own to performance

in the kinds of activities that are characteristic of their culture. The kind of intellectual skills which are valued in western culture, and which are emphasized in schools which attempt to prepare people to participate in a culture which is strongly influenced by industrial technology, may be a very limited slice of the kinds of intellectual performance of which man is capable.

If intellectual development is highly dependent on the experiences which a child has in his home environment, and if different cultures facilitate the development of differing kinds of intellectual capabilities, then it would seem logical to assume that the differential school performance of children from different cultural backgrounds may be attributable to the fact that their experiences are <u>different</u>, not that their backgrounds are deficient. This may seem to be a rather subtle distinction, but very likely the nature of intervention strategies will differ greatly depending whether one views a child's background as deficient, or merely different. In this project we made the latter assumption.

Most intervention programs have been designed to "compensate" for experiences presumed to be missing in the backgrounds of children who are culturally different from middle-class Anglo-Americans. The majority of these compensatory intervention programs have concentrated their resources on the school or pre-school instruction, although a few educators have interviewed in the home through parent training programs (Gray, 1971; Barbrock and Horton, 1970; Gordon, 1969; Weikart, 1967).

A common limitation of contemporary approaches to working with the home and family is that often the objectives are so many and so diverse, or so poorly defined, that it would be virtually impossible to attribute any particular observed outcome to specific intervention activities. This is certainly true of many parent involvement components of programs such as Head Start

and Follow Through. This fact hampers the systematic development of a knowledge base which would be useful in designing programs.

Intervention programs which are aimed at parents are rarely clearly conceptualized and articulated to any systematic theoretical framework. It seems essential that such a framework be established and validated through systematic research. Because school centered intervention programs have generally failed to demonstrate long term effects (Swift, 1964; O'Brien and Lapapte, 1968; Horowitz and Paden, 1969), it is becoming increasingly clear that the academic achievement of groups of children who have traditionally done poorly in school cannot be ameliorated by merely changing school curricula and methods. It therefore seems likely that our best chance for long range effects lies on the design of effective procedures which parents can apply to support the development of specified cognitive skills in their children.

As we have stressed earlier, an accumulating body of literature makes it clear that children's experiences in the home account for a generous share of variance in those intellectual performance characteristics which are presumed to facilitate learning in the school setting (Wolf, 1964; Davé, 1963; Henderson, 1968; Henderson, Bergan, and Hurt, 1972). Further substantiation for the importance of the home in facilitating the intellectual development of children is found in data from the Coleman Report (Coleman, Campbell, Hobson, McParlend, Mood, Wenfeld, and Tork, 1966) which suggests that the home environment contributes more to the variance in school performance than does the quality of the school program. Moreover, data now emerging from an international study confirm this fact on a massive cross-cultural basis (Arizona Daily Star, 1973).

Social Learning Principles and the Socialization of Intellectual Skills: A number of investigations have been conducted in an attempt to identify specific socialization practices which have an effect on the intellectual development of young children. Schoggen and Schoggen (1971) have extended Barker's (1968) strategies for the study of social ecology by conducting live observations in the home environments of young children. They have identified environmental force units by which adults influence the behavior of their children. Another line of investigation has grown out of the work of Davé and Wolf, who demonstrated substantial relationships between their environmental process variables and measures of intelligence (Wolf, 1964) and academic achievement (Davé, 1963). Henderson (1966) extended this line of investigation by demonstrating that with measures of environmental process variables it is possible to discriminate rather clearly between families of disadvantaged Mexican-American children who performed relatively well or poorly on conventional measures of intellectual performance, and that these environmental measures are capable of predicting educational achievement over the first three years of school (Henderson, 1972). Work of this sort has practical implications for hypothesizing variables which may provide an effective framework for the design of parent-training programs. Such hypotheses may be tested directly to determine the effects of manipulating given environmental variables in an attempt to effect specific outcomes in the development of children's intellectual skills. Henderson and Garcia (1973) have argued that in order to produce unambiguous conclusions regarding the effects of parent behavior on child development we should proceed from descriptive studies on the type cited above, to applied experimentation which should begin by focusing narrowly upon a restricted range of child behavior. It could be thus determined if specific aspects of development can be influenced by parents

who have been trained in the use of procedures hypothesized to facilitate that behavior.

At this point in our efforts to develop a conceptual framework to guide attempts to help parents to practice socialization practices which might facilitate a child's intellectual development, social learning theory (Bandura, 1969, 1971) seems to provide to most comprehensive yet parsimonious model for the design of parent training. It is commonplace observation that children learn a great deal by observing and imitating what other people do. It has been only comparatively recently, however, that psychologists have attempted to identify the precise processes involved in observational learning, and to determine what conditions serve to enhance or reduce the possibility that a child will learn and perform a behavior which he has observed. This theory has been explicated in detail by Bandura (1969, 1971). Early research on observational learning was concentrated on social behaviors, such as dependence or aggression, but recent work has been extended to consider the influence of modeling on children's acquisition of cognitive, rule governed behavior. In this kind of learning, "Observers must abstract common attributes exemplified in diverse modeled responses and formulate a principle for generating similar patterns of behavior (Bandura, 1969, p. 149)." through modeling procedures children have been taught such cognitive skills as conservation on a series of Piagetian tasks (Rosenthal and Zimmerman, 1972), seriation on length (Zimmerman and Lanaro, 1972), the use of various language constructions (Bandura and Harris, 1967; Odom, Liebert and Hill, 1968), creativity (Zimmerman and Dialessi, in press), and in the use of various interrogative classes (Rosenthal, Zimmerman, and Durning, 1970). Social learning principles have been used effectively to teach question-asking behavior to disadvantaged Mexican-American children in group setting

(Zimmerman and Pike, 1972), and Mexican-American parents have been taught to use these procedures to teach question-asking skills to their children (Henderson and Garcia, 1973).

The study by Henderson and Garcia (1973) has demonstrated that parents can learn to use social learning principles in the intellectual socialization of their children. In that case, however, the parents were trained by experienced and highly trained graduate students, in settings in which high standards of quality control could be maintained. Therefore, while the socialization practices have been demonstrated to be effective, the present project presented a challenge in that paraprofessionals would have to be trained to train the parents, and close monitoring could not be maintained. Favorable results under these circumstances would provide evidence on both the power of the principles and on the feasibility of developing an effective system of training services for parents, using paraprofessional members of the reservation communities as parent trainers.

We mentioned earlier that question-asking was chosen as the target behavior for this investigation because of the superintendent's expressed interest in finding ways of getting children to ask more and better questions. Other skills, such as giving directions, were also discussed as possible objectives and could have been chosen for intervention, but aside from the informal needs assessment which led to this study, there are other rather compelling reasons for choosing question-asking as a target behavior. Question-asking is a very important information seeking skill which a person can use to elicit information from his environment and teach himself. Investigators concerned with linguistic and cognitive development have long asserted that question-asking is central to all problem solving (Blank and Covington, 1965). Suchman (1964), who has worked for years to develop strategies to train

children in inquiry processes, has asserted that ". . . a realistic approach to conceptual growth must allow the learner to gather and process data in accordance with his cognitive needs of the moment, and this suggests he could be utilizing some kind of inquiry (p. 68)."

Available data also generally indicate that question-asking behavior in young children develops at a faster rate for children of higher socio-economic status backgrounds than for children from lower socio-economic status backgrounds (McCarthy, 1930; Davis, 1932), and that disadvantaged or culturally different groups perform at a lower level of question-asking than do their more advantaged peers (vide Martin, 1970). Anecdotal reports on the performance of Papago Indian children generally indicate that the children ask few questions in the school classroom or in other interactions, at least with Anglo-American adults. If there actually is a higher frequency of question-asking behavior in the repertoire of middle-class white populations than in the repertoire of reservation Papago children, and the ethnographic literature also suggests that this may be the case (Joseph, Spicer, and Chesky, 1949), then this fact may have implications for understanding the discrepancy in school performance between Papago children and middle-class Anglo children, and between more and less successful learners within either of these groups.

In this research we were interested in changes in the kind of questions asked by children, as well as in an increase in number or rate. This approach was based on the assumption that questions of varied types play differential roles in intellectual functioning and problem solving. The developmental literature indicates that questions that call for names of objects, for example, develop earlier in children's linguistic repertoires than do <u>why</u> and <u>how</u> questions. Piaget (1926) found a very low incidence of questions calling for explanations in his study of the language of two six year old

boys. Cazden (1970) indicates that by means of epistemic, or why and how questions, ". . . a disparity between our past experience and some present event becomes, for the child, (or the scientist) the growing point of his knowledge (p. 213)."

Since causal questions, those which generally ask why, how come, or what would happen if . . ., appear to be of critical importance to the kind of intellectual growth which is functional in a scientifically oriented and technologically based society, it seemed reasonable to focus on this category of questions in this investigation.

Ethical and Cultural Considerations

Several factors must be considered when any intervention effort is contemplated, and this is especially true when the intervention involves people whose culture and traditions differ from those of the dominant group in the society. In the present project, two issues seemed to require particular attention. These issues relate to both the general aims of the intervention, and to the training strategies employed.

The project was designed to teach Papago children to ask more questions, and specifically to ask questions about causal relationships. We have been cautioned by some critics that question-asking is not a valued behavior in Papago culture. We do not know to what extent this may be true today, but historically this seems to have been the case. In The Desert People, Joseph et al (1949) reported that

> Characteristically, Papago children learn mainly by imitation, without explanation by adults and without asking many questions. . . . direct question and answer is not the Papago way of acquiring or giving information; hence the Papago child is not encouraged to ask how to do things (p. 132).

It might then be reasoned that, since the asking of questions is not a traditional way of acquiring information in Papago culture, teaching

question-asking skills would constitute an unjustified intrusion into the life-way of a people.

On similar grounds one might criticize the use of social reinforcement practices which parent participants in the program were trained to apply in their teaching sessions with their children. We believe that reinforcement principles operate universally in human learning, but Papago parents may use such subtle means of approval that specific-reinforcement practices are not immediately discernible to Anglo psychologists. Joseph et al (1949) have stated that:

> Adults give little, if any, assistance to the novice, but they watch her closely and make it clear that they are pleased if she succeeds. Direct praise, however, is seldom given (p. 132, emphasis added).

From this statement it would appear that there was continuity between Papago custom and those aspects of our training procedures which were based on modeling and imitative learning. But we also taught the parents to use verbal praise in their efforts to influence the question-asking of their children.

These considerations raise the possibility that there may have been discontinuities between previous cultural conditioning and some of the goals and procedures of the program. On the other hand, both reinforcement and question-asking seem to be important skills for social participation in the dominant group. If Papago citizens are to be afforded the opportunity to function in a pluralistic society, then perhaps they should have the opportunity to choose for themselves whether to participate. A decision on our part not to undertake this project would have meant for us to preempt a decision which we felt rightfully belonged to potential participants. By conducting the project, we, in a sense, gave potential participants greater latitude of

freedom of choice than if the project had not been conducted. Potential participants could choose to become involved with the project, or to have nothing to do with it.

We might also add that it seems to be increasingly important for Papagos to have good question-asking skills even on the reservation. Repeatedly, programs and propositions are presented to Papago leaders for consideration. We have observed that in such situations Papago leaders and members of representative bodies do ask questions, and the questions they ask, or fail to ask, have a direct influence on what happens to their people.

In view of these considerations we elected to undertake the project, fully realizing that it is fashionable to be critical of any activity that appears to tinker with a people's culture. The point has been well put by Angela Garcia (Garcia et al, 1972), who says

> Those of us who train parents cannot engage in self-delusions about not tampering; we must acknowledge that we are, in fact, changing parents and children and that we believe they would benefit by changing in some way. Any protestations to the contrary may be modish but are useless, irresponsible, and even negligent (pp. a-b).

Evidence to be reviewed later does suggest that the participants in this study do value formal education, and see it as important for their children. The program and its purposes were fully explained to each parent contacted, and they had the option to participate or not. Presumably, a successful program of this type might open up even further options which an individual may accept or decline. In view of these considerations the project was undertaken, albeit with a healthy regard for these important issues which cannot be resolved with any absolute set of criteria of which we are aware.

## Method

### I. Subjects

Essentially there were two major training areas to which the project staff directed themselves. First, was the selection and training of two Papago paraprofessionals who would be primarily responsible for instructing the selected parent participants. The second task was the actual training of those selected parents.

The paraprofessionals were selected from applications solicited from the BIA employment agency. It was necessary that those selected for this procedure be literate, speak both Papago and English fluently, live within the reservation community, and have access to the subjects to be solicited. In addition the school board required that the individuals selected have a high school education. From four applications received, two women were selected for training as paraprofessionals on the basis of those criteria.

Subjects for the training program consisted of thirty mothers of first grade children who attended Indian Oasis and Topawa elementary schools. The mothers were selected for participation in the program via a stepwise procedure. First, two groups of first grade students were randomly selected from the official class lists; each of the two groups comprised thirty students selected in this manner. Second, Papago paraprofessionals made home visits to the selected families and solicited parent cooperation. At this point, the goals of the program were explained as well as the effort and time requirements that would be requested of participating parents. Third, if a family from the first random sample was either uninterested or unable to expend the necessary effort and time, a replacement family was selected from the second sample and similarly approached.

In this manner a final group of 30 subjects who agreed to participate in the project was selected. Since training not only required formal sessions with trainers, but also time spent with their children at home between sessions, it appeared essential that involved parents demonstrate an interest and willingness to cooperate for the entire duration of their training. Finally, these thirty parents were assigned to three sub-samples comprising 10 parents each, which were to be trained consecutively during the course of the school year.

II. Design

While in intervention research of this nature, it is most desirable to utilize a comparable control group in assessing the significance of obtained treatment differences, this is frequently difficult to accomplish with research conducted in the natural environment. The noncomparability of groups that could result, were this model to be pursued, might result in a loss of meaningfulness in the data collected. It appeared quite probable with this project that selection and utilization of comparable control groups would be difficult if not impossible to achieve. First, the available sample of first grade children was limited, and therefore selection of similar S's with regard to residence area, ability, and family economic and educational level could not have been accomplished. Second, the ethical question of soliciting cooperation from parents of children who would receive no benefit from the program, did not appear acceptable to either school district personnel or project staff. For these reasons, then the prospect of obtaining adequate controls for a traditional quasi-experimental design was rejected.

In order to meaningfully assess change without the use of a control group, then, a multiple baseline design was selected. In such a design, the experimental groups can be subjected to treatment at varying time intervals

to eliminate the possible confounding effects of maturation and history. In the present example, the point of intervention for the three sub-samples was staggered with training occurring at three different points in time in order to accomplish this objective. The second and third treatment groups, therefore, function as replications of the original experiment, and if similar results are obtained for each group, this can constitute evidence for the functional relationship between the treatment program and the observed increase in the children's performance on the particular intellectual skill (in this case question-asking).

While replication of this sort would appear to be sufficient demonstration of that functional relationship, it was decided that in addition a priori multiple t-tests would be employed to assess the statistical significance of obtained results. With a specific set of hypotheses that an experiment is designed to test, planned comparisons among means that are orthogonal can be carried out by using a t ratio.(Kirk, 1968). In this case three pre-planned t-tests were to be carried out: (1) comparison between baseline conditions for all groups and final performance following treatment of all three groups, (2) comparison between the treated group and untreated groups following the training of the first group of parents, and (3) comparison between treated groups and the remaining untreated group following the training of the second set of parents. In this manner evidence for the accomplishment of the objectives would be assessed by two methods i.e. replication and statistical analysis.

III. Procedure

In order to assess practice effects and retention, it was necessary to collect data on question-asking skills for all children at four points in time. The first data collection point constituted baseline information

(i.e. pretest) on all three groups. Data was collected a second time following completion of training for Group I; hence this served as an additional pretest for the second and third groups but a post-test measure for Group I. The third data collection point, following training of the second sample of parents, similarly served as an additional pretest for Group III, a post-test measure for Group II and a retention or maintenance of program effects test for Group I. Finally, the fourth data collection point following the training of the third parent sample yielded post-test measure on Group III, and maintenance of effects measures for Group I and II. Table 1 demonstrates the scheduling of data collection on all children for the duration of the project.

The measurement of the effect of the independent variable (i.e. training program) on the dependent variable (question-asking) was accomplished by means of an individually administered test of question-asking performance. This test, consisting of three phases, was administered to all children at each data collection point. The instrument consisted of two sets of twelve stimulus pictures of common objects. The examiner explained: "Now we are going to play a game. Your part in the game is to ask questions. When we're through playing the game, you'll get a surprise, okay?" During Phase I (Baseline) of the examination, the subject was presented with the first set of cards, one at a time, and the examiner would direct the child to ask a question about each one. For Phase II (Instruction) the examiner used the same set of cards but modeled one question per card for the subject while no immediate response was required from the child. To initiate this sequence the examiner told the child: "Now its my turn to play the game. I'm going to ask the questions. You don't have to answer them, but listen carefully because you will have another turn later." Following this modeling sequence,

TABLE 1

SCHEMATA DEPICTING RELATIONSHIP AMONG TRIALS
AND INTERVENTION FOR THREE GROUPS

| | Trial I | Training | Trial II | Training | Trail III | Training | Trail IV |
|---|---|---|---|---|---|---|---|
| Group I | Pre-test | Intervention | Post-test | No intervention | Maintenance of effects test | No intervention | Second maintenance of effects test |
| Group II | Pre-test | No intervention | Second pre-test | Intervention | Post-test | No intervention | Maintenance of effects test |
| Group III | Pre-test | No intervention | Second pre-test | No intervention | Third pre-test | Intervention | Post-test |

the subject was again presented with the same set of cards and directed to ask a question about each one. Phase III (Generalization) consisted of presenting the subject with the second set of new stimulus cards; the examiner would tell the child he could have another turn but with new pictures. A reinforcer of sugar-coated cereal was delivered following completion of the task. This was intended to be reinforcement for cooperation for participation in the game rather than contingent upon a specific performance and was, of course, delivered to all children.

During the examination, a second person was present to code the subjects' responses into four categories:

1. Silence
2. Statement
3. Non-causal question
4. Causal question

The subject received 3 scores (one for each phase) which consisted of the number of causal questions asked. Intercoder reliability for the testing situation was 94% agreement between coders. Neither the examiner nor the coder were aware of the treatment process nor which of the children had participated in the program, nor to which group they were assigned, as several other children, in addition to the subjects, were tested at data collection points to insure this double blind.

IV. Paraprofessional Training

The first major step following the selection of subjects and paraprofessionals was the training of the latter in the necessary skills needed for the parent training sequence. Training of these two women took approximately three months and was conducted by two members of the project staff. The skills necessary for the paraprofessionals to acquire during this training are enumerated in the following objectives:

Paraprofessionals will be able to:

1. role-play mother-child interaction sequence employing stimulus materials in the same style as modeled by the trainers.
2. differentiate and count questions from non-questions with 100% accuracy during modeled mother-child interaction sequence.
3. use contingent verbal praise to reinforce questions with 100% accuracy while modeling sequence.
4. distinguish causal from non-causal questions, praising only causal ones with 100% accuracy while modeling sequence.
5. model causal questions at the rate of one question per stimulus page while modeling sequence.
6. combine counting, praising, and modeling of causal questions with 100% accuracy for all skills in a modeling sequence.
7. explain following concepts in English and Papago:
   a. question-asking
   b. causal versus non-causal questions
   c. use of verbal reinforcement
   d. use of modeling
8. communicate goals of program to participants and others in the community.

The training procedure was accomplished with the use of primarily two teaching techniques, direct instruction involving demonstration supplemented by verbal description and role-playing. Direct instruction was used to communicate goals, concepts, definitions, and explain rationale behind procedures. All other skills were taught through the role playing of the desired mother-child interaction patterns; as was to be the case with parent participants, positive reinforcement was employed frequently with the paraprofessionals to augment motivation.

Each training session followed the following format:

1. Trainers would explain rationale, desired outcome, and importance of particular skill being considered.
2. Trainers would model a mother-child interaction sequence employing the selected skill for a ten minute period.
3. Paraprofessionals would role-play the skill in the same manner as the trainers for the same length of time.
4. The process would continue until the paraprofessionals could produce the sequence with 100% mastery of the skills in question.

In the same manner each skill was taught along with the appropriate rationale. Once the paraprofessionals had demonstrated mastery of the training skills, they were presented with written lessons for use with the parent groups. They then role-played these lessons prior to meetings with the parents so that the trainers could be assured of the paraprofessionals' level of competence.

V. Parent Training

Following completion of their training, the paraprofessionals began their formal sessions with the first group of parents. Formal sessions were held on a semi-weekly basis but for those parents who either did not attend or had failed to satisfy criteria for mastery of a specific skill, training was supplemented with home visits made by the paraprofessionals. Between formal sessions, participating parents performed two 10 minute sessions with their children in which they practiced the previously learned skill. During these child-sessions the mother would record a frequency count on the number of questions asked by her child, which would later be graphed by the paraprofessionals as a record of the child's progress in acquiring the skill.

The lesson content, the objectives of the lesson, and the criteria specified for mastery are included in Table 2. The same criteria for mastery and same lesson format were applied to each of the three groups. Following each session, the paraprofessionals would discuss the proficiency of the individual mothers, based on their observations, and would arrange the supplementary training for those experiencing difficulty. Since the skills were viewed as cumulative, mastery needed to be attained by all mothers prior to the succeeding lesson.

Each lesson was designed according to a similar format. Following a review, the paraprofessionals would introduce the skill to be practiced in the lesson and would discuss that skill with the parents answering questions that might arise. Then the paraprofessionals would model a mother-child interaction sequence employing the selected skill. Finally, the mothers would break into pairs and would role-play the modeled sequence under close monitoring by the paraprofessionals. This process would continue until the skill was acquired and the mothers reached the pre-specified level of mastery. The pictorial children's books that were used as stimulus materials in the parent lessons were checked out by mothers for use with their children at home.

The actual format of the lessons closely follow those developed in another question-asking study that involved a parent-training program (Garcia, Hoffman, and Lauritsen, 1972). However, lessons had to be modified due to a different cultural context and the fact that some of the prerequisite skills were relatively foreign to the mothers involved, e.g., the use of verbal praise and role-playing techniques. Most of the lessons were quite long with every sequence broken down very finely into a series of small steps. All through the course of the training, mothers received ample positive reinforcement for their performance during training.

TABLE 2

OBJECTIVE OF PARENT TRAINING

| Lesson | Objectives: Participating parent will be able to: |
|---|---|
| 1. Rationale and Counting | 1. Role-play mother child interaction in the style modeled by the paraprofessionals.<br>2. Count questions during modeled interaction sequence within ±2 of paraprofessionals count. |
| 2. Praising Questions | Use contingent verbal praise for questions asked at least 50% of the time when performing interaction sequence. |
| 3. Differentiating Causal and Non-causal Questions | Count only causal questions in a sequence containing many kinds of utterances to within ±2 of paraprofessionals count. |
| 4. Model Causal Questions | Model one causal question/page of stimulus materials while performing interaction sequence. |
| 5. Continuation | Combine skills of modeling, prasing, counting causal questions during interaction sequence at the specified level of mastery. |

VI. Other Interests

Anticipating that the project could result in differential response patterns to intervention, additional kinds of information were sought at the conclusion of the training procedure. It was hoped that additional data might be helpful in identifying possible reasons for the individual differences and possibly illuminate any relationships between these differences in question-asking performance and other achievement or environmental variables.

First, to provide an approximate estimation of degree of acculturation in the families participating in the program, the paraprofessionals were requested to rate degree of acculturation on a three point scale. Those families were rated as most traditional who had acquired the least observable facets of the dominant culture (e.g., material possessions such as cars, modern homes), who still spoke primarily the Papago language in their homes, and who acquired their livelihood in the more traditional manner (e.g., ranching, farming). The middle category included families who had acquired some of the material possessions and styles of the dominant culture, whereas in the third category were placed those families whose life-style, language, and possessions closely resembled that of Anglos with the exception of reservation residence.

Second, the most recent Metropolitan Achievement Test scores were collected on all participating children. The standard scores made available to the project staff included Word Analysis, Total Reading, and Total Mathematics.

The final type of information collected was responses by participating mothers to the Henderson Environmental Learning Process Scale (HELPS) (Henderson, Bergan, and Hurt, 1972). The HELPS interveiw schedule is an

interview instrument of 55 items comprising 5 scales designed to elicit information regarding the environmental process variables of achievement aspiration, environmental stimulation, parental guidance, models, and reinforcement practices that have been hypothesized to contribute to educational performance. In this project, the interest was in examining any possible relationships between environmental forces in the home and degree of success encountered in the present training project. The paraprofessionals were trained in the administration of the instrument and were able to collect this data on 27 of the 30 families involved in the program.

As an exploratory post-hoc test, a factor analysis was performed to evaluate any possible interpretable factors that might emerge. While the researchers are aware that factor analysis with a sample of this size (n=30) is not recommended, the procedure was viewed as an exploratory measure that hopefully might suggest other research possibilities.

## Results

The data collected on the children are presented in Table 3 and Figure 1. The table contains the means and standard deviations for each phase and time of testing for all groups. The figure represents graphically the changes noted in question-asking performance. One may note in this graph that the performance of Group I continued to improve on the maintenance of effects measures. Consideration of this observation will be included in the Discussion section.

A priori multiple t-tests were performed on this data. The first t-test compared the mean of all groups on the generalization scores of the examination at testing Time 1 to the generalization mean at testing Time 4. The generalization scores were chosen for the comparison as they constitute the most stringent test of program effects. The second t-test compared at test

TABLE 3

MEANS AND STANDARD DEVIATIONS OF BASELINE, INSTRUCTION AND GENERALIZATION SCORES FOR THREE TREATMENT GROUPS ON FOUR TRIALS

| Group | | Trial I | | | Trial II | | | Trial III | | | Trial IV | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | BL | I | G | BL | I | G | BL | I | G | BL | I | G |
| I | $\bar{X}$ | 0.00 | 4.00 | 3.00 | 5.20 | 6.30 | 5.20 | 6.60 | 7.70 | 8.00 | 8.20 | 8.30 | 8.20 |
| | SD | 0.00 | 5.12 | 4.67 | 5.25 | 5.29 | 5.46 | 5.04 | 5.12 | 5.29 | 5.69 | 5.73 | 5.73 |
| II | $\bar{X}$ | 0.00 | 4.10 | 1.90 | 0.00 | 3.87 | 1.13 | 4.60 | 6.00 | 6.00 | 5.90 | 5.90 | 6.00 |
| | SD | 0.00 | 5.19 | 3.67 | 0.00 | 5.11 | 3.00 | 5.66 | 6.00 | 6.00 | 6.23 | 6.23 | 6.32 |
| III | $\bar{X}$ | 0.00 | 3.25 | 1.13 | 0.00 | 2.38 | 2.88 | 2.30 | 2.30 | 2.40 | 3.60 | 5.90 | 6.00 |
| | SD | 0.00 | 4.54 | 2.00 | 0.00 | 4.22 | 5.02 | 4.61 | 4.61 | 4.80 | 5.79 | 6.23 | 6.32 |

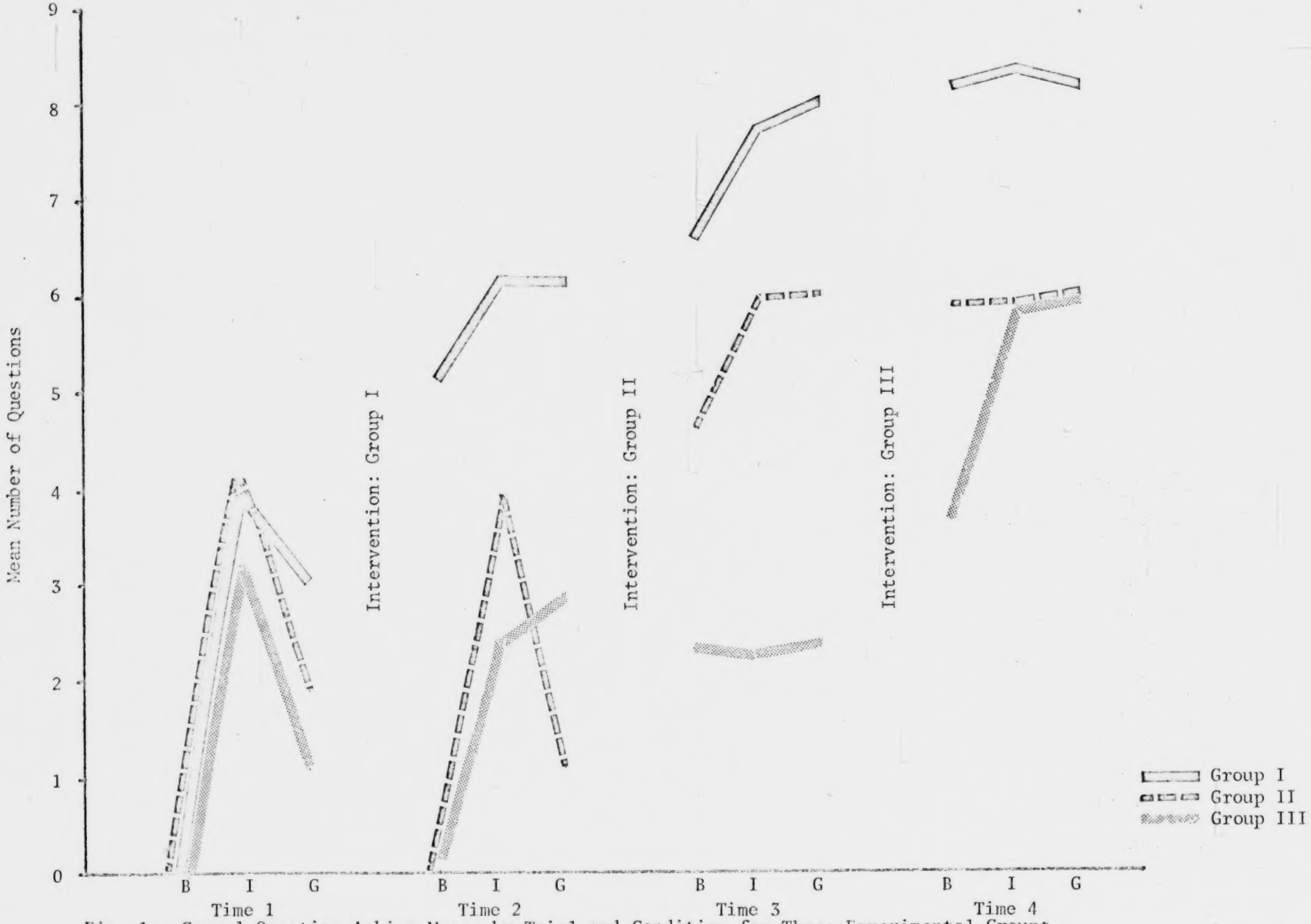


Fig. 1: Causal Question-Asking Means by Trial and Condition for Three Experimental Groups

Time 2 the mean of the treated group (Group I) with the combined mean of untreated Group II and III. The third t-test compared at test Time 3, the combined mean of treated Groups I and II with the mean attained by untreated Group III.

Such t-tests do meet the necessary prerequisites of orthogonality and of falling into the a priori category (Kirk, 1968). One should note that according to Kirk it is not necessary to perform on overall test of significance prior to carrying out planned orthogonal t-tests.

It was decided to test the significance of the obtained t's at the .05 level [$t_{.05}$ (df 108)=1.658] as close experimental control had not been possible under the conditions of the project. However, the obtained t's for the first test (t=3.1753), the second test (t=3.2102), and the third test (t=10.0494), were significant not only at the .05 level but also at the .01 level [$t_{.01}$ (df 108)=2.38].

In examining test information across individual protocols, it is interesting to note that in virtually all cases the resulting data is in dichotomous form, i.e. children either received a score of 0 or a mastery score of 10 to 12 for performance in the final phase of testing. Of all the children exposed to training with their parents 57% demonstrated mastery despite the fact that all mothers had undergone training until proficiency was reached. This observation raised questions as to why these individual differences in the children's performance was noted. In an effort to more clearly examine this phenomonon a phi coefficient was calculated on the dichotomous scores received during the first Instructional Phase and the final Generalization score. Initial response on the part of the child to instructional modeling could be viewed as an index of that child's amenability to modeling influences. Phi calculated on that data produced a correlation coefficient

of .53 which is significant at α level .01. It should be noted that the interpretive meaning of $\phi$ is not precisely the same as that associated with the usually $r_{xy}$, as $\phi$ can only attain a value of +1 when the distributions are identical (Glass and Stanley, 1970). Since in this case this condition was not met, the obtained $\phi$ coefficient could be viewed as an underestimation of the relationship between initial amenability to modeling and final performance.

To further examine possible explanation for these noted individual differences, the relationship between question-asking performance and the achievement data was examined, but there did not appear to be any correlation between these variables.

The information collected with the HELPS was subjected to item analysis to assess item correlations with the scale score and the reliability of the instrument. Obtained item-scale correlations ranged from .05 to .89. Twenty four of the item reliabilities were significant at the α .01, thirteen additional items were significant at .05, and five significant at α level .10. Reliability for the scales and the total score assessed by the method for Cronbach Alpha is shown in Table 4.

TABLE 4

HELPS RELIABILITY DATA

| Score | Alpha |
|---|---|
| 1 | .61 |
| 2 | .53 |
| 3 | .68 |
| 4 | .63 |
| 5 | .81 |
| Total | .79 |

Examination of the frequency of responses to the scale were also interesting from a descriptive viewpoint (Appendix A) especially as reflects the attitude of the mothers toward education of their children. Ninety-three percent responded that formal school would be very important to their child's future, and 85% similarly expressed the view that vocational training would be very important to their child's future. Furthermore, 85% responded that formal education is very helpful in getting people a better life. While the percentages might possibly reflect social desirability influence, it sould be noted that such dramatic results were not observed on the many other items that could be viewed as evidence of response bias due to social desirability.

The final step in the analysis of the data involved the post-hoc factor analysis on all the collected information i.e. all question-asking test scores, response to the 55 HELPS items, achievement data, and acculturation rating. In all, 71 variables were subjected to a principal components factor analysis and varimax rotation for the extraction of 5 factors. While not all the factors are clearly interpretable, they do appear to be suggestive. Factor I accounted for all the question-asking variables while the achievement scores loaded on the fifth factor independent of both question-asking and HELPS responses, HELPS data loaded on Factor II and III with the acculturation ratings also included in Factor III. A summary of the content and the loadings for the rotated Factors II and III are presented in Table 5.

Factor II seemed to reflect the amount of direct adult attention the child received from his parents suggested by the loadings on items reflecting parental interaction with the child in respect to educational pursuits and inclusion of the child as a participant in activities.

TABLE 5

FACTOR LOADINGS

| Content | Loading |
|---|---|
| **Factor II: Direct adult attention** | |
| 1. If (CHILD) asks you a question you can't answer, how often do you try to find the answer by looking in a book? | .73 |
| 2. How often did you try to help (CHILD) count or learn numbers before he started school? | .71 |
| 3. How much did you help (CHILD) to recognize words or letters before he entered school? | .70 |
| 4. How much did you read to (CHILD) before he/she could read for himself/herself? | .68 |
| 5. How often do you tell friends or family members about some clever thing (CHILD) has said? | .65 |
| 6. How often do you tell your child that she/he has behaved well at school? | .63 |
| 7. When you are planning some activity for the family (eg: taking a trip) how often do your children participate? | .62 |
| 8. How often do you tell your child that he/she has done good work at school? | .61 |
| 9. How often do you ask (CHILD) about what he has done in school? | .55 |
| 10. How often do your children talk to adults about things that interest them? | .52 |
| 11. How often does (CHILD) see you reading a novel, or some other book? | .51 |
| 12. How often do you explain to (CHILD) that steps must come first, second, and so on, in doing some task? | .50 |
| 13. How often do you read the newspaper? | .48 |
| 14. Not counting what happens at school, how often does (CHILD) go to the library, or a museum, or someplace like that? | .48 |

Table 5 - Factor Loadings (cont.)

| Content | Loading |
|---|---|
| Factor II (cont.) | |
| 15. If (CHILD) brings something home that he's done at school, how likely are you to comment on it or talk with him/her about it? | .44 |
| 16. How often do you take (CHILD) along when you go shopping? | -.49 |
| Factor III: Contact with broader culture. | |
| 1. How many organizations do you belong to? (eg: Service Clubs, PTA, Church groups, Sororities) | .69 |
| 2. How often do you visit someone who is not related to you? | .55 |
| 3. How often do you take part in social activities in which some of the people are of different ethnic groups or races. (eg: church, parties, etc.) | .53 |
| 4. How often do you give (CHILD) a pat or hug or something like that when you are pleased with the way he is learning? | .52 |
| 5. Acculturation rating. | .49 |
| 6. How often do you take (CHILD) on a trip out of town? | .47 |
| 7. How often do you take part in a community action or political activity? (eg: CAP, PAC, AREA Council, Young Rep, Young Demo, League of Women Voters) | .47 |
| 8. How often do members of your family (including the children) get together on weekends to do something to enjoy themselves. | .46 |
| 9. How often do you visit with friends who live in neighborhoods other than your own? | .44 |
| 10. How often do you watch the news on television? | .37 |
| 11. How often do you attend social gatherings? (eg: parties, dances, church activities, PTA) | .32 |
| 12. How important will practical or vocational job training be for (CHILD'S) future? | -.32 |

Table 5 - Factor Loadings (cont.)

| Content | Loading |
|---|---|
| Factor III (cont.) | |
| 13. What kind of grades do you expect (CHILD) to get in school? | -.43 |
| 14. How often do your children (your child) come to you with homework problems? | -.49 |
| 15. How often does your child come to you for help on school work? | -.61 |

Factor III appears to be a particularly interesting and suggestive one. While this would seem to reflect the amount of contact experienced with the dominant culture, some questions arise. Ten of the fourteen HELPS items included on this factor load in the same direction as acculturation, but four do not. These four all seem to reflect educational aspiration for the child and could suggest that those who experience greater contact with the dominant culture may have a more pessimistic view toward the gains obtainable for themselves through education; those Papago families less exposed to the realities of Indian-Anglo relations may still respond according to the idea.

As mentioned before, the factor analysis performed here was only an exploratory measure designed to be revealing of areas worthy of research pursuits. Hence, these reported results are intended as suggestive possible hypotheses for further examination rather than as final descriptions of data.

## Discussion

The results of this experiment demonstrate that the project was successful in teaching Papago first-grade children to ask causal questions. Consistent increases in causal question-asking in responses to instruction via instructional modeling by the experimenter were replicated in this research with three separate groups, demonstrating that modeling procedures constitute an effective means of teaching a specific intellectual skill. This finding supports the results of other investigations of the effects of modeling procedures on information seeking skills (Zimmerman and Pike, 1972; Rosenthal, Zimmerman, and Durning, 1970; Henderson and Garcia, 1973) which have been conducted in other kinds of settings and with different social and ethnic groups of children.

Clearly, the most important finding of this investigation was that when parents intervened by practicing, with their own children, socialization skills which they learned in a training program conducted by Papago paraprofessionals, the children's performance on the question-asking tasks increased significantly over performance attributable to direct modeling instruction by the experimenter. This finding is of considerable practical significance, for a number of reasons. First, the importance of socialization practices such as those used in this study is demonstrated by the fact that children whose parents used the social learning principles which they learned in the training program performed better on the target behvaiors than did children whose parents had not yet been trained to employ such practices. This finding lends credence to the observation that the differences between the performance of treated and untreated groups, where the treatement is a set of procedures applied by a parent in the home environment, resemble differences which we typically find between children sampled from two populations which differ in social class or ethnicity. Henderson and Garcia (1973) have suggested a parallel between the results of planned parental intervention on a specific skill, and the natural circumstances in which a wider range of behaviors may be supported by parents or others at home. Thus, we may have an experimental demonstration of what might happen in a less planned way in what has been called the "hidden curriculum of the middle class home." In brief, the results of this experiment provide evidence that if a particular skill or set of skills is seen as a desirable objective, then that skill may be learned more effectively if parents learn to provide specific support for it, than if the responsibility for teaching the skill is left solely to the school.

It is therefore seen as important that this study provides objective evidence for the efficacy of parental applications of learning-theory based procedures for the intellectual socialization of their children. Furthermore, the study demonstrates the feasibility of training indigeneous paraprofessionals in this relatively isolated setting to conduct effective training for Papago parents to provide a supportive environment for the intellectual socialization of their children. It should be relatively easy to teach parents to generalize the use of the procedures they have now learned and to apply them to the development of other desired skills in their children. The feasibility of doing this, and of training the paraprofessionals to do the training, should be given high priority for future investigation.

One interesting finding relating to the data on question-asking was that the performance of Group I continued to rise after intervention, while such a pattern was not found for Group II, for which maintenance of effects data were also available. In retrospect it seems possible that this continuing increase in the performance of Group I may have been an artifact of the research design. The procedures of offering a treat at the end of a testing session, non-contingent on the quality of the child's performance, is common in research of this type. The intent is to develop a positive valence toward the examiner and the testing setting, without giving feedback on the "correctness or incorrectness" of the child's responses. Such feedback might well contaminate performance in future data collection efforts. In the present research, the parents of children in Group I began, soon after the testing session, to work with their children on causal-question asking. Parent intervention for this group, then, may have provided feedback to these subjects at an early point in time. On the other hand, children in Group II and III returned to the testing van for a second data gathering

session before any intervention was begun in the home. Without this intervening feedback, children in Group II and III may have thought that during the preceding testing session they did just what they were supposed to, because they received a "treat" for their good efforts. Therefore, during subsequent testing sessions in the van they persisted in responses similar to those which apparently "paid off" in their earlier sessions. There should be further study of this possibility that the use of reinforcement that is not contingent on the quality of responses may inadvertantly establish a response set.

Another important finding was the fact that some children were much more responsive to the modeling instruction provided by the experimenter, and to the intervention by their parents, than were other children. Traditionally, the outcomes of experiments similar to this one have been assessed only on the basis of the average performance of groups (vide Bandura, 1965; Rosenthal, Zimmerman, and During, 1970). Close inspection of our data revealed, however, that a portion of the children in each treatment group did not respond to the modeling by the experimenter, or to the intervention strategy, at least as performance was measured in this study. The fact that children's responses to the initial modeling by the experimenter showed a significant relationship to final generalization scores indicates that one could predict with better than chance accuracy which children would be most amenable to the intervention. This information on amenability to modeling instruction was obtained within the first five minutes on our interaction with each child. It thus appears that such information on initial amenability to modeling might have diagnostic value in future instructional efforts.

If a child does not respond favorably on an initial modeling task, it might be prudent to explore conditions that would be effective in teaching

requisite skills and response modes which are required for a child to profit optiminally from the modeling instruction. For example, explorations might involve task analysis and the use of carefully sequenced, small stepped instruction, to shape in the precursor behaviors. This could be done in future work with a series of single subject experiments , in which each child serves as his own control. Efforts of this type would have implications beyond this immediate project. An inspection of means and standard deviations from published research which would be judged highly successful in terms of influences on the average performance of groups, suggests that even in studies that were conducted with good control under near laboratory conditions, children respond differentially to treatment. Therefore, while a treatment may be very effective for some children in a group, or even for most of them, it is important to learn what individual modifications in the procedures might serve to enhance the learning performance of children who are not amenable to the effects of the standard modeling procedure.

Parenthetically, it should be mentioned that we have some evidence that some children who did not perform well in the testing situation did respond well to instruction by a parent in the home setting. This evidence is in the form of data kept by parents during their home sessions. We have cause to believe that some of the records are reasonably accurate, but the information is not sufficiently complete to justify a formal analysis. Nevertheless, a possible discrepancy of this type would have important implication for future work, and should be studied further.

Interesting implications for the education of children such as the boys and girls who participated in this study are also suggested by the factor analysis which was performed as a post hoc exploration of available data. This analysis was conducted to see if it might lead to hunches concerning

why some children responded to the modeling instruction, and others did not. The first finding of some importance was that question-asking performance and academic achievement, as measured by the Metropolitan Achievement Test, loaded on entirely different factors. This would suggest that well planned instruction, targeted on specified intellectual skills, may be effective irrespective of a child's general level of past performance on general measures of achievement in academic subjects. This finding may be interpreted as consistent with the view that these children's backgrounds should be considered as different in some ways from the backgrounds of middle-class Anglo children, but not that the background is deficient. If there are skills which have a value in the culture, or cultures, in which a child must eventually function, and if those skills are not being learned routinely in the natural environment, the skills can probably be taught, and our data suggest that the success with which they are acquired will not necessarily be limited or enhanced by general academic achievement.

We have suspected for some time that there might be differential patterns of predictors of scholastic success for different groups of people. In past research interpretable environmental factors on the HELPS have been found to predict academic achievement, but in this study neither the original sub-scales of HELPS nor the factors derived from a post hoc factor analysis were significantly related to measures of academic performance. This suggests that perhaps past assumptions about environmental conditions that contribute to academic success must be reconsidered. This further suggests to us that while it would be interesting to know what factors do contribute to academic achievement in this setting, it might be more profitable for parents, educators, and tribal leaders to decide what skills are most important for

their children to acquire, and to design programs which would coordinate home and school efforts to teach those skills.

In this connection it was also noteworthy that acculturation ratings given by the paraprofessionals loaded on a factor completely separate from academic achievement. The limitations of interpreting a factor analysis based on so few subjects have been mentioned earlier. Nevertheless this finding makes it worth considering the possibility that level of acculturation per se is not necessarily associated with academic achievement. This seems to be an especially strong possibility, since the HELPS items which loaded with the acculturation ratings were interpretable, and make logical sense as aspects of acculturation in this setting.

In summary, the modeling procedures which were used to provide instruction in question-asking in the testing setting were effective in increasing children's rates of causal-questions asking in response to a standard set of stimulus cards. Question-asking performance was further improved by the intervention strategy, in which parents applied procedures which were designed to promote the socialization of the intellectual skill of question-asking in their children. There appeared to be no deterioration in question-asking skills over time. Descriptive data, in the form of acculturation ratings of participant families, measures of learning variables in the children's home environments, and achievement measures consisting of word analysis, reading, and mathematics scores on the Metropolitan Achievement Test, appeared to be unrelated to the degree to which children profited from the experimental procedures. This suggests that specific valued intellectual skills can be taught effectively to these children, irrespective of their level of acculturation or past academic achievement. Moreover, the results of the study give strong support to the proposition that parents can be trained to use

socialization practices which might provide a significant increment of performance over what might be expected on the basis of direct instruction outside the home, and the training of parents can be carried out successfully by trained indigeneous paraprofessionals.

REFERENCES

Blank, S.S. and Covington, M. Inducing children to ask questions in problem solving. The Journal of Educational Research, 1965, 59, (1), 21-27.

Bandura, A. Principles of behavior modification. New York: Holt, Rinehart and Winston, 1969.

Bandura, A. Social learning theory. New York: General Learning Press, 1971.

Bandura, A., and Harris, M.B. Modification of syntactic style. Journal of Experimental Child Psychology, 1966, 4, 341-352.

Barker, Roger G. Ecological psychology: Concepts and methods for studying the environment of human behavior. Stanford: Stanford University Press, 1960.

Bloom, B.S. Stability and change in human characteristics. New York: Wiley, 1964.

Bruner, J.S. The course of cognitive growth. American Psychologist, 1964, 19, 1-15.

Cazden, C.B. Children's questions: Their forms, functions, and roles in education. Young Children, 1970, 25, (4), 202-220.

Coleman, J.S., Campbell, E.Q., Hobson, C.J., McPartland, J., Mood, A.M., Weinfeld, F.D., and Tork, R.L. Equality of educational opportunity. (No. OE-38001) Washington, D.C., United States Government Printing Office, 1966.

DARCEE Papers and Reports, Vol. 4, No. 4, Nashville: George Peabody College for Teachers, 1970.

Davé, R.H. The identification and measurement of environmental process variables that are related to educational achievement. Unpublished Doctoral dissertation, University of Chicago, 1963.

Davis, E.A. The form and function of children's questions. Child Development, 1932, 3, 57-74.

Garcia, Angela, Hoffman, Huntley, and Lauretsen, Ed. Description of a program to train parents to influence the development of question-asking skills in their young children. Tucson, Arizona: University of Arizona, Arizona Center for Educational Research and Development, 1972.

Glass, Gene V. and Stanley, Julian C. Statistical methods in education and psychology, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970.

Gordon, Ira J. The Florida Parent Education Model. In I.F. Gordon (Ed.), Reaching the child through parent education: The Florida Approach. Gainesville, Florida: University of Florida, College of Education, Institute for Development of Human Resources, 1969.

Gray, Susan W. Ethical issues in intervention research. DARCEE Papers and Reports, Vol. 5, No. 5, Nashville: George Peabody College for Teachers, 1971.

Henderson, R.W. Environmental predictors of academic performance of disadvantaged Mexican-American children. Journal of Consulting and Clinical Psychology, 1972, 38, 297.

Henderson, R.W. Environmental stimulation and intellectual development of Mexican-American children: An exploratory study. Unpublished Doctoral dissertation, University of Arizona, 1966.

Henderson, Ronald W., Bergan, John R., and Hurt, Maure, Jr. Development and validation of the Henderson Environmental Learning Process Scale. Journal of Social Psychology, 1972, 88, 185-196.

Henderson, R.W. and Garcia, A. The effects of a parent training program on the question-asking behavior of Mexican-American children. American Educational Research Journal, 1973, (in press).

Henderson, R.W. and Merritt, C.B. Environmental backgrounds of Mexican-American children with different potentials for school success. Journal of Social Psychology, 1968, 75, 101-106.

Horowitz, F. and Paden, L. The effectiveness of environmental intervention programs. In B. Caldwell and H. Ricuitti (Eds.), Review of child development research. Vol. 3, New York: Russell Sage Foundation, 1969.

Hunt, J. McV. Intelligence and experience. New York: Ronald Press, 1961.

Joseph, Alice, Spicer, Rosamond, B., and Chesky, Jan. The desert people: A study of the Papago Indians. Chicago: University of Chicago Press, 1949.

Kirk, Roger E. Experimental design: Procedures for the behavioral sciences. Belmont, California: Wadsworth Publishing Company, Inc., 1968.

Martin, F. Questioning skills among advantaged and disadvantaged children in first grade. Psychological Reports, 1970, 27, 617-618.

McCarthy, D. Language development of the pre-school child. University of Minnesota Institute of Child Welfare, (Monograph Series No. 4), 1930.

O'Brien, R., and Lopate, C. Preschool programs and the intellectual development of disadvantaged children. Urbana, Illinois: ERIC Clearinghouse on Early Childhood Education, 1968.

Odom, R.D., Liebert, R.M., and Hill, J.H. The effects of modeling, cues, reward, and attentional set on the production of grammatical and ungrammatical syntactic construction. Journal of Experimental Child Psychology, 1968, 6, 131-140.

Piaget, J. The language and thought of the child. New York: World Publishing Company, 1955.

Rosenthal, T.L., and Zimmerman, B.J. Modeling by exemplification and modeling in training conservation. Developmental Psychology, 1972, 6 (3), 392-401.

Rosenthal, T.L., Zimmerman, B.J., and Durning, K. Observationally-induced changes in children's interrogative classes. Journal of Personality and Social Psychology, 1970, 16 (4), 681-688.

Schoggen, M., and Schoggen, P. Environmental force units in the home lives of three-year-old children in three population subgroups. Nashville, Tennessee: Peabody College, DARCEE Papers and Reports, Vol. 5, No. 2, 1971.

Suchman, J.R. The child and the inquiring process. In A.H. Passow and R.R. Leeper (Eds.), Intellectual development: Another look. Washington, D.C.: Association for Supervision and Curriculum Development, 1964

Swift, J.W. Effects of early group experience: The nursery school and day nursery. In M.L. Hoffman and L.W. Hoffman (Eds.), Review of child development research (Vol. 1). New York: Russell Sage, 1964.

Wikart, David P. (Ed.). Preschool intervention: A preliminary report on the Perry Preschool Project. Ann Arbor, Michigan: Campus Publishers, 1967.

Wolf, Richard M. The identification and measurement of environmental process variables related to intelligence. Unpublished Doctoral dissertation, University of Chicago, 1964.

Zimmerman, B.J., and Dialessi, F. Modeling influences on children's creative behavior. Journal of Educational Psychology, (in press).

Zimmerman, B.J. and Lanaro, P. Acquiring and retaining conservation of length through modeling and reversibility cues. Unpublished manuscript, University of Arizona, 1972.

Zimmerman, B.J. and Pike, E.O. Effects of modeling and reinforcement on the acquisition and generalization of question-asking behavior. Child Development, 1972, 43, 892-907.

# APPENDIX A

## PERCENT OF PARTICIPANTS REPONSES TO INDIVIDUAL HELPS ITEMS

HELPS INTERVIEW SCHEDULE

1. Not counting what happens at school, how often does (CHILD) go to the library, or a museum, or someplace like that?

   Once a week 7 : 4 : 33 : 22 : 33 Less than once a year

2. Not counting things like school field trips, how often does (CHILD) go to a zoo, an aquarium, or someplace like that?

   Once a week 0 : 11 : 33 : 22 : 33 Less than once a year

3. What chance does your husband have to get ahead in his job?

   Good 19 : 11 : 37 : 0 : 0 Poor

4. If (and when) (CHILD) graduates from high school, what are his/her chances of getting a good job?

   Good 19 : 11 : 37 : 0 : 0 Poor

5. What kind of grades do you expect (CHILD) to get in school?

   Excellent 52 : 22 : 26 : 0 : 0 Failing

6. When (CHILD) has a chance to choose what to do around the house, how often does he/she choose to look at a book or magazine?

   Almost every day 44 : 15 : 22 : 7 : 11 Very Seldom

7. How often do you attend social gatherings? (eg: parties, dances, church activities, PTA)

   Once a week 7 : 26 : 44 : 7 : 15 Less than once a year

8. How often do you take (CHILD) on a trip out of town?

   Once a week 7 : 48 : 33 : 0 : 11 Less than once a year

9. How often do you take (CHILD) along when you go shopping?

   Almost weekly 11 : 37 : 37 : 7 : 4 Almost never

10. (IF APPLICABLE) How many organizations does your husband belong to? (eg: PTA, Unions, Fraternal Orders, Service Clubs, Fraternities)

    None 48 : 7 : 7 : 11 : 0 Four or more

11. How many organizations do you belong to? (eg: Service Clubs, PTA, Church groups, Sororities)

    None 12 : 22 : 4 : 15 : 4 Four or more

12. How often do you take part in social activities in which some of the people are of different ethnic groups or races. (eg: church, parties, etc.)

Once a week 4 : 11 : 15 : 15 : 48 Less than once a year

13. How often do you take part in a community action or political activity? (eg: CAP, PAC, AREA Council, Young Rep, Young Demo, League of Women Voters)

Once a week 4 : 7 : 11 : 48 : 22 Less than once a year

14. How often do you visit someone who is not related to you?

Almost daily 0 : 15 : 30 : 19 : 33 Almost never

15. How often do you visit with friends who live in neighborhoods other than your own?

Almost daily 7 : 26 : 30 : 11 : 22 Almost never

16. How often do you talk to (CHILD) about things he/she has seen on TV?

Almost daily 22 : 26 : 7 : 7 : 7 Almost never

17. How often do you suggest that (CHILD) watch some educational TV program such as Sesame Street, Captain Kangaroo, or Mr. Rogers?

Almost weekly 56 : 4 : 7 : 4 : 7 Never

18. If (CHILD) asks you a question you can't answer, how often do you try ot find the answer by looking in a book?

Always 7 : 41 : 26 : 7 : 19 Never

19. How often does (CHILD) see you reading something?

Almost every day 26 : 41 : 11 : 19 : 4 Never

20. How often does (CHILD) see you reading a novel, or some other book?

Almost every day 22 : 44 : 22 : 4 : 7 Never

21. (IF APPLICABLE) How much education (school, training, and so on) has your husband had?

No training beyond grade school 30 : 19 : 30 : 7 : 0 College Graduate

22. (IF APPLICABLE) How often does (CHILD) help his/her father when he is working on some project? (Building something, fixing something, working around the home)

Very often 19 : 30 : 26 : 7 : 4 Never

23. When you are working around your home, how often does (CHILD) help? (eg: cooking, sweeping, picking up)

Very often 37 : 33 : 26 : 4 : 0 Never

24. How often does (CHILD) play school at home, or at a neighbor's place?

Very often 19 : 30 : 48 : 4 : 0 Never

25. How often does (CHILD) play that he/she is grownup?

Very often 11 : 44 : 30 : 7 : 7 Never

26. How often does (CHILD) play house?

Very often 19 : 33 : 26 : 11 : 11 Never

27. How much do you (or some other adult) talk with (CHILD) at mealtime?

Most of the time 52 : 19 : 19 : 4 : 7 Not much

28. How much did you read to (CHILD) before he/she could read for himself/herself?

Almost daily 15 : 56 : 15 : 7 : 7 Almost never

29. How often does your child come to you for help on school work?

Very often 30 : 30 : 22 : 11 : 7 Never

30. How often do you tell your child that she/he has behaved well at school?

Very often 33 : 15 : 33 : 15 : 4 Never

31. How often do you tell your child that he/she has done good work at school?

Very often 37 : 26 : 37 : 0 : 0 Never

32. How often do you watch the news on television?

Daily 37 : 15 : 7 : 4 : 11 Never

33. How important will practical or vocational job training be for (CHILD'S) future?

Very important 85 : 11 : 0 : 4 : 0 Unimportant

34. How important will formal schooling be for (CHILD'S) future?

Very important 93 : 4 : 4 : 0 : 0 Unimportant

35. What kinds of grades do your children (does your child) have to get in school in order to satisfy you?

Excellent 48 : 37 : 11 : 4 : 0 Just passing

36. Does formal education really help people to get a better life?

Very helpful 85 : 7 : 7 : 0 : 0 Not helpful

37. How many organizations or clubs does (CHILD) belong to? (eg: scouts, little league, YMCA, church youth groups)

None 74 : 19 : 4 : 4 : 0 Four or more

38. How many children's books do you have in your home?

None 15 : 26 : 15 : 15 : 30 More than ten

39. How often do members of your family (including the children) get together on weekends to do something to enjoy themselves?

Weekly 19 : 22 : 41 : 4 : 15 Less than once a year

40. How often do you have as guests in your home, or visit in the homes of friends who have more education or better jobs than yourself (your husband)?

At least once a week 0 : 22 : 7 : 22 : 48 Almost never

41. What is the most school completed by any friends or relatives who have frequent contact with your children?

0-6 years 15 : 26 : 30 : 22 : 7 15 or more years

42. How much schooling have you had?

No training beyond grade school 22 : 26 : 37 : 15 : 0 College graduation

43. How many magazines (give examples) do you subscribe to?

None 59 : 22 : 7 : 4 : 7 Four or more

44. How often do you read the newspaper?

Daily 15 : 37 : 22 : 11 : 15 Almost never

45. When you are planning some activity for the family (eg: taking a trip) how often do your children participate?

Each time 33 : 26 : 22 : 15 : 4 Very rarely

46. How often do your children talk to adults about things that interest them?

Several times a day 26 : 37 : 22 : 0 : 15 Very rarely

47. How often do your children (your child) come to you with homework problems?

Very often 19 : 26 : 33 : 7 : 15 Never

48. How often did you try to help (CHILD) count or learn numbers before he started school?

Very often 33 : 22 : 37 : 4 : 4 Never

49. How much did you help (CHILD) to recognize words or letters before he entered school?

A great deal 19 : 26 : 33 : 15 : 7 None

50. If (CHILD) brings something home that he has done at school, how likely are you to comment on it or talk with him/her about it?

Very likely 70 : 11 : 15 : 0 : 4 Very unlikely

51. How often do you ask (CHILD) about what he has done in school?

Almost every day 48 : 30 : 19 : 0 : 4 Almost never

52. How often do you give (CHILD) a pat or hug or something like that when you are pleased with the way he is learning?

Very often 37 : 30 : 22 : 11 : 0 Almost never

53. How often do you tell friends or family members about some clever thing (CHILD) has said?

Very often 26 : 26 : 37 : 7 : 4 Almost never

54. When (CHILD) goes someplace with you, how likely are you to try to point out things which he/she may not have noticed before?

Very likely 37 : 41 : 22 : 0 : 0 Very unlikely

55. How often do you explain to (CHILD) what steps must come first, second, and so on, in doing some task?

Frequently 37 : 41 : 22 : 0 : 0 Seldom